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Professor Heilprin compares the irregularities of this bad material, denounced by me as bad, and concludes that it is good evidence for doubting the value of that which was considered to be more reliable. Such reasoning obviously affords only a *non sequitur*. I do not think any one who has passed laborious days and nights in the determination of angles by repetition and reversal will agree with Professor Heilprin that the system of "extracting averages" is "delusive;" and a reference to my report will show that it was a question of comparison of averages with a view to the weighing of methods with which, in that instance, I was concerned, which could hardly delude any one who chose to read what was printed on the pages before him. Averages may be made delusive, but not when used in this manner.

In conclusion, although the whole subject is one for experts and professional surveyors rather than others, I may summarize for those who are interested and unprofessional the main features of what was done in 1874 for the purpose of getting at the height of that unattainable peak.

In the determination of any height by triangulation, there are to be considered the character of the instruments, the distance of the peak, the vertical angle measured, and the refraction of the atmosphere, which distorts the line of sight and introduces an error, tolerably constant for high angles and short distances in ordinary latitudes, but irregular and sometimes very great in angles measured when the line of sight passes near the surface of the earth, especially for long distances and in high latitudes.

In the case of Mount St. Elias the distance depended upon a horizontal triangle observed from two astronomically determined stations, giving an astronomical base-line from which the lines converging on the peak were obtained by an astronomical azimuth. The value of such an intersection depends somewhat upon the size of the angle, which in this case was large, nearly 60°. The liability to error which very small angles of intersection may introduce was therefore measurably avoided.

The positions of the ends of the base-line were well determined. The circumstances of the observation made at sea were eminently favorable. The error of this position could hardly have exceeded three miles on the worst assumption; and the error of distance which this would produce in the base of the vertical triangle, upon which the height depended, was trifling. The instruments were first-class of their kind. The vertical angle measured, I venture to say, is beyond dispute. The uncertainty remaining, therefore, was in regard to the refraction,—a factor beyond our power to determine, and equally undetermined in all observations made to date.

However, the height of Mount Fairweather was tolerably well determined from positions near its base. We reasoned the error of refraction might be assumed to be the same for both mountains at the same moment, both being visible and not differing very greatly in their distance from our station. The difference between the height of Fairweather as measured from near its base, and that which we might obtain for it from our Port Mulgrave station, might be assumed to be due to refraction, and an analogous amount applied to the result for St. Elias as a correction for that unknown error. This was an assumption, of course, but a reasonable one, and was adopted.

The height of Mount St. Elias may very possibly be less than our results would show; but that they were likely to be correct within certain limits seemed probable, from the fact that angles measured by Malespina in the last century, the record of which is fortunately preserved, when computed with a corrected base-line in accordance with our observations for the position of the mountain, gave results approximating our own,—an apparent confirmation which was certainly impressive.

The outline of our proceedings is given, as above, in entirely untechnical language, but those who are professionally qualified to judge the character of such work are confidently invited to examine the report itself in the Coast Survey volume for 1875. This is somewhat amplified from the extra advance copies which were distributed before the publication of the volume. I make no pretence to the character of a geodetic expert, but the comparatively simple computations contained in this report were prepared and reviewed by those who are; and the error, if error there be in the

results, is due to factors which were entirely independent of the observers or the computers, under the circumstances.

Smithsonian Institution, Washington, D.C., Nov. 11. WM. H. DALL.

Chalk from the Niobrara Cretaceous of Kansas.

REFERRING to Professor S. W. Williston's interesting communication in *Science* for Oct. 31, on microscopic organisms from the chalk of the Niobrara cretaceous of Kansas, I should suppose it to be highly probable that the forms met with by him are, as he supposes, coccoliths. Coccoliths are very abundant in, and sometimes form a notable proportion of, the calcareous parts of the Niobrara beds in Manitoba and in Nebraska, and are there associated with foraminifera and with rhabdoliths, to which latter class the slender, rod-like bodies, also noted by Professor Williston, may be referrible. Figures and a description of a number of varieties of coccoliths and rhabdoliths from the cretaceous of Manitoba may be found in the *Canadian Naturalist* for April, 1874 (p. 256).

GEORGE M. DAWSON.

Geological Survey of Canada, Nov. 10.

BOOK-REVIEWS.

Races and Peoples. By DANIEL G. BRINTON. New York, N. D. C. Hodges. 8°. \$1.75.

DR. BRINTON has undertaken the difficult task of presenting the whole vast field of anthropological science in a concise and readable form, and he has admirably succeeded in giving us a book that is attractive, and, in all its parts, suggestive. Therefore not only will it prove useful in making the public acquainted with the facts and some theories of ethnological science, but it will also incite the painstaking student to more thorough investigation of mooted questions, and open new vistas in many fields of research. Dr. Brinton's theories, even such as may not appear acceptable, are always full of ingenuity, and certainly worth the careful attention of anthropologists. The present book, notwithstanding the brevity with which necessarily all problems are treated, teems with new ideas and excellent critical remarks. In reviewing it, we must confine ourselves to selecting a few of the more important points. On the whole, we might wish that some still very doubtful theories to which the author adheres were not presented with quite as much assurance as finally settled.

The introductory chapter, on "The Physical Elements of Ethnography," strikes us least favorably. We think that not sufficient stress has been laid upon the great variations inside each race, and that too much is made of the peculiarities of the "lower" races, which in some respects might be called rather exaggerated human types than simian in character. The second chapter, "The Psychical Elements of Ethnography," is a succinct presentation of the chief causes governing the development of society. The author distinguishes associative and dispersive elements: the former including the social instinct, language, religion, and arts; the latter, the migratory and combative instincts. Dr. Brinton is inclined to consider the sexual instincts and the resulting parental and filial affections to be the prime cause of association, and rejects all theories based on promiscuity. The third chapter will be found full of interest, more particularly where the author sets forth his ideas regarding the development of man, as well as his classification of mankind. Although he knows how to present his views with much force, we cannot consider his description of the earliest stages more than an ingenious hypothesis, because we have so far no means of reconstructing the history of the period immediately after man had made his appearance. Dr. Brinton believes that mankind during the preglacial period was homogeneous, his industries paleolithic with simple implements, his migrations extensive, his language rudimentary. Such speculations can neither be proved nor disproved. Even the character of the glacial period, as described by Dr. Brinton, is largely hypothetical. He believes the migrations to have been limited at the time, the races to be living in fixed areas. It seems impossible to fix any period for these events which have certainly taken place at some time. The author's general ethnographic classification is based on physical characters. According to these, he distinguishes Eurafrican, Austrofarian, Asian, American, and

insular and littoral peoples. These he divides into branches which are not very well defined, there being portions of a race separated geographically, linguistically, or otherwise, from other portions of the race. The branches are subdivided into linguistic stocks. This system is open to the same objection which must be made to Fr. Müller's: it is neither physical nor linguistical; and these two classifications, being based on entirely distinct phenomena, cannot be made to agree. The rest of the book is devoted to the discussion of the various races. The author sees the primal home of the Eurafican race in North Africa, whence he believes the Hamitic, Shemitic, and Aryan people derive their origin. The last he considers as a mixed race on account of the predominance of two distinct physical types. If we should apply this test to any of the better known peoples, we would have to class them among the mixed races. There is certainly no homogeneous variety of man in any part of the world. Therefore the reduction of the Aryan race to two prototypes seems somewhat doubtful. We cannot enter into the interesting sketch of the other races, but confine ourselves to the remark that the descriptions, though brief, are always striking and interesting. In a concluding chapter Dr. Brinton sums up a number of important problems,—those of acclimatization, race-mixture, and of the ultimate destiny of the races. The author emphasizes justly the close relations between ethnography and historical and political science. His work will undoubtedly greatly contribute to making this close connection better known and more thoroughly understood.

The Trees of Northeastern America. By CHARLES S. NEWHALL. New York, Putnam. 8°. \$2.50.

FOR its purpose, this book is admirable. The plan of the author was excellent, and he has carried it out well. There are defects in the book; but, as they are more of omission than of commission, they may be passed over with scarce a mention. In simple fashion and almost untechnical language, the author describes our trees, from their foliage, bark, and general appearance, so that they may be readily identified by persons without even a smattering of botanical knowledge. The trees described include all the native trees of the northern United States east of the Mississippi, as well as those of Canada. Mention is also made of the more important of the introduced and naturalized species. The work is so arranged that any given specimen can be readily found by help of a well-arranged guide. The author's chief authority for the geographical distribution of the different species is Sargent's report in the "Tenth Census;" and for the scientific nomenclature adopted, Mr. Newhall acknowledges his indebtedness to Professor N. L. Britton of Columbia College. The latter gentleman, in a brief prefatory note, says, "There is great need of such a popular work. It will do much good in supplying information to our people about some of the common things around them, and this in an attractive manner."

The method of using the book is as simple as can be desired. Provided with a leaf of the tree to be identified, the inquirer, by a brief inspection of the easily mastered guide, is referred to the pages containing a drawing of the leaf (and sometimes the fruit) and the name and description of the tree. Both the popular and the scientific names are given, together with some account of the uses of the tree, and its distribution. Photo-engravings of the leaves and fruit, instead of the somewhat crude outline drawings, would, we think, have been more in keeping with the excellent mechanical make-up of the book, and would have added much to its value.

The Antiquities of Tennessee. By GATES P. THRUSTON. Cincinnati, Robert Clarke, 1890.

THE present volume is an excellent *résumé* of the results of recent archaeological investigations in Tennessee. It is amply illustrated by good photo-engravings and numerous sketches of well-selected specimens. Many of them do not differ essentially from the well-known types of this region; but others will be found to be of great interest; for instance, the tattooed face bowl (p. 94), and the image in clay showing an infant strapped to a cradle-board (p. 112). The descriptions of the finds are so full of new, valuable, and well-arranged matter, that they will repay a close study. The conclusions which the author draws from his studies

seem to be in the main well founded. He justly emphasizes the fact that the finds show no evidence whatever of a culture of a stamp different from that of the North American Indians, more particularly from that of the southern Indians as described by early travellers. He is also right in laying stress upon the dissemination of culture among the inhabitants of pre-Columbian America, which entails transmission not only of arts and industries, but also of manufactures. While in the introductory chapter of his book he does not consider the culture of the mound-builders as much higher than that of the Indians shortly before they came into contact with the whites, it seems, that, while studying the specimens, the culture of the mound-builders appeared to the author of increasing value; so that in his concluding chapter he is inclined to assume a decline of culture during the period following the "stone grave time." We believe that this decline may have been somewhat overestimated by the author, but we fully agree with his opinion that the mound-builders of Tennessee were Indians, and that the relics do not belong to any great antiquity. The author assumes that the decline in culture came about by an invasion from the north of a race which he believes he can recognize in a number of dolichocephalic crania taken from the stone graves. This proof must be rejected, as it is founded on the theory that a race is homogeneous, while actually, even in long-isolated races, we must expect to find a great variety of forms. Unfortunately archaeologists do not yet duly appreciate the importance of osteological collections, a few well-preserved skulls being all that are deemed worthy of preservation. Broken skulls, and particularly skeletons, ought to be preserved as well, as only a thorough investigation of *all* the remains of a race will lead to reliable conclusions. Physical anthropology does not consist of a few cranial measurements, but is a detailed study in comparative osteology of man.

AMONG THE PUBLISHERS.

THE *Jenness-Miller Magazine* for November contains another article on "Physical Culture," by Miss Mabel Jenness; and "Temperance in Food," by Burcham Harding.

—Among the interesting exhibits at the American Institute Fair in this city is a handsome showcase filled with samples of the books published by E. & F. N. Spon of this city and London.

—A new edition of No. 57 of Van Nostrand's Science Series ("Incandescent Electric Lighting") has just been issued. New papers, by L. H. Latimer and C. J. Field, take the place of those by Du Moncel and Preece in the former edition, bringing the work more nearly to date.

—Vol. IV. No. 7 of the "Studies from the Biological Laboratory" of Johns Hopkins University, Baltimore, contains two articles,—one, "Notes on the Anatomy of *Sipunculus Gouldii Pourtales*," by E. A. Andrews (with plates); and the other, "The Relationships of Arthropods," by H. T. Fernald (with plates).

—The Leonard Scott Publication Company, New York, announce that beginning with the November number they will in the future furnish their subscribers with the original Edinburgh edition of *Blackwood's Magazine*, printed in Edinburgh, and published by them here under authority of Messrs. William Blackwood & Son.

—The *Illustrated American* makes an offer in our advertising columns which may prove attractive to some of our readers. This weekly has certainly contained much interesting matter, unusually well illustrated, concerning the goings-on in the world, in which intelligent people are interested, and it is only to be regretted that in the recent numbers certain criminal affairs have been made prominent and served up in a style likely to entrap the unsuspecting reader into their perusal. The periodical is a new one, and deserves a careful examination at the hands of the reading public.

—Messrs. Houghton, Mifflin, & Co. have published a small volume entitled "Thoreau's Thoughts," consisting of brief passages selected from Thoreau's various writings by H. G. O. Blake. The selections seem to have been made with good judgment, except that they are too short. The editor has not included many of those passages descriptive of natural objects that so abound in